

SEVERE LOCAL STORMS, DECEMBER 1941

[Compiled by Mary O. Souder]

[The table herewith contains such data as has been received concerning severe local storms that occurred during the month. A revised list of tornadoes will appear in the United States Meteorological Yearbook]

Place	Date	Time	Width of path, yards	Loss of life	Value of property destroyed	Character of storm	Remarks
Libby, Mont., vicinity of California, the Bay area and parts of the northern portion. ²	2-3 16	A. m.			\$1,330	Heavy rain..... Wind and rain.....	Damage to roads and bridges. San Francisco escaped damage except that some trees were blown down and basements flooded. In Oakland 2 houses were unroofed letting in sheets of rain on the surprised occupants. At Dunsuir basements of some business establishments were flooded. Tons of dirt and rock, loosened by rains in widely scattered sections of the State, caused State Scenic Route 28, between Geyserville and Calistoga in Sonoma County, to be closed. State Route 1, the coast road south of San Francisco, was closed temporarily by slides between Rockaway Beach and Half Moon Bay. There were reports of fallen trees and temporary light disruption in some peninsula localities.
Winfield, Kans.	22	2 p. m.	11		4,000	Hail.....	Windshields, glass in greenhouses, and electric signs broken; path 2 miles long.
Saunders and Seward Counties, Nebr.	22	7-9 p. m.	10		2,000	Ice.....	Loss chiefly to utilities.
Mamou, Morrow, and ² Goudreau, La., and vicinities.	25	11 a. m.		0	15,000	Tornado and heavy rain.	Storm started in the vicinity of Mamou and ended in Goudreau. 18 homes were leveled and 16 persons injured. Galvanized roofing, pieces of lumber, and household furniture found more than a mile from the scene of the tornado.
Oloh, Miss.	31					Squall.....	Several houses blown down and timber damaged.

¹ Miles instead of yards.
² From press reports.

SOLAR RADIATION AND SUNSPOT DATA FOR DECEMBER 1941

[Solar Radiation Investigations Section, I. F. HAND in charge]

SOLAR RADIATION OBSERVATIONS

BY IOLA PAIN

Measurements of solar radiant energy received at the surface of the earth are made at 9 stations maintained by the Weather Bureau and at 12 cooperating stations maintained by other institutions. The intensity of the total radiation from sun and sky on a horizontal surface is continuously recorded (from sunrise to sunset) at all these stations by self-registering instruments; pyrheliometric measurements of the intensity of direct solar radiation at normal incidence are made at frequent intervals on clear days at three Weather Bureau stations (Madison, Wis.; Lincoln, Nebr.; and Albuquerque, N. Mex.), and at the Blue Hill Observatory at Harvard University. Occasional observations of sky polarization are taken at the Weather Bureau station at Madison and at Blue Hill Observatory.

The geographic coordinates of the stations, descriptions of the instrumental equipment, station exposures, and methods of observation, together with summaries of the data obtained, up to the end of 1939, are given in the MONTHLY WEATHER REVIEW for December 1937, April 1941, and September 1941.

Table 1 contains the measurements of the intensity of direct solar radiation at normal incidence, with means and their departures from normal (means based on less than 3 values are in parentheses). At Lincoln, Madison, Albuquerque, and Blue Hill the observations are obtained with a recording thermopile, checked by observations with a Smithsonian silver-disk pyrheliometer at Blue Hill. The table also gives vapor pressures at 7:30 a. m. and at 1:30 p. m. (75th meridian time).

Table 2 contains the daily total amounts of radiation received on a horizontal surface from both sun and sky for all stations except Fairbanks, Alaska; and also the weekly means, their departures from normal, and the accumulated departures since the beginning of the year. The values at most of the stations are obtained from the Eppley pyrheliometer recording either on a microammeter or a potentiometer. If the daily figures for total solar and sky radiation at Fairbanks should be desired, they may be obtained approximately 2 months after the date of the observation by writing to the Solar Radiation Investigations Supervisory Station, Blue Hill Observatory, Milton, Mass. Table 2 also includes values of ultraviolet radiation below 3132 Angströms at San Juan (see Mo. WEA. REV., Sept. 1941, p. 286).

Radiation at normal incidence was close to normal at all stations during December. Lincoln reports that since the removal of the normal-incidence apparatus from the university experimental station to the downtown office, heavy smoke from nearby chimneys has at times seriously interfered with direct radiation readings.

Total solar and sky radiation received on a horizontal surface during December was above average for all stations for which normals have been computed with the exception of Madison, Lincoln, LaJolla, Blue Hill, Ithaca, and Fairbanks.

The average departure for continental United States in 1941 was +1.7 percent, and for all stations which had complete data for the year and including Alaska was +0.7 percent. Polarization measurements made at Madison on three days gave an average of 75 percent with a maximum of 77 percent on the 18th. Both of these values are above the December normals.

TABLE 1.—Solar radiation intensities during December 1941

[Gram-calories per minute per square centimeter of normal surface]

LINCOLN, NEBR.

Date	Sun's zenith distance											
	7:30 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p.m.	
	75th mer. time	Air mass									Local mean solar time	
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.	
Dec. 1	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.		
Dec. 2	6.50	-	-	-	-	-	1.03	-	-	6.27		
Dec. 3	3.63	-	-	-	-	-	1.20	1.09	0.99	6.02		
Dec. 5	4.75	-	-	-	-	-	1.24	1.14	1.05	4.95		
Dec. 6	2.62	0.87	1.04	1.22	-	-	-	-	-	4.37		
Dec. 8	3.00	1.05	1.18	1.31	-	-	1.31	1.20	1.11	3.81		
Dec. 10	.97	.94	1.04	1.18	-	-	-	-	-	1.52		
Dec. 18	3.45	-	1.05	1.22	-	-	-	-	-	5.79		
Dec. 23	3.45	-	-	-	-	-	1.16	1.07	.99	2.74		
Means	-	.95	1.08	1.23	-	-	1.19	1.12	1.03	-		
Departures	-	.01	-.02	-.01	-	-	-.01	+.06	+.08	-		
ALBUQUERQUE, N. MEX.												
Dec. 1	3.82	0.98	1.12	1.24	-	-	1.14	1.05	4.36			
Dec. 2	3.59	-	-	-	1.39	-	1.38	1.19	1.09	4.17		
Dec. 4	4.17	-	-	-	-	-	1.34	1.16	1.08	3.00		
Dec. 5	1.97	1.13	1.22	1.35	-	-	1.48	-	-	2.06		
Dec. 7	2.49	1.10	1.24	1.35	-	-	1.45	1.34	1.20	1.11	2.61	
Dec. 8	2.38	1.05	-	-	1.24	1.38	-	1.29	1.18	1.05	2.86	
Dec. 9	2.38	1.01	1.10	1.26	-	-	-	-	-	2.61		
Dec. 12	4.58	-	-	-	1.24	1.41	-	-	-	4.95		
Dec. 15	3.46	-	-	-	-	-	1.04	.90	3.82			
Dec. 16	3.30	-	-	-	1.40	-	-	1.21	1.18	1.08	3.59	
Dec. 18	3.30	1.08	1.18	1.31	1.47	-	-	1.28	1.18	1.08	3.82	
Dec. 19	3.00	1.12	1.19	1.33	-	-	1.46	-	1.20	1.08	3.00	
Dec. 23	2.06	1.13	1.24	1.34	1.45	-	-	-	-	2.26		
Dec. 30	3.63	1.07	1.18	1.30	1.46	-	1.48	1.34	1.21	1.12	3.99	
Dec. 31	3.45	1.03	1.16	1.37	-	-	-	-	-	3.81		
Means	-	1.07	1.18	1.30	1.42	-	1.45	1.28	1.16	1.06	-	

	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.	
mm.	cal.	mm.									
Dec. 1	6.50	-	-	-	-	1.03	-	-	6.27		
Dec. 2	3.63	-	-	-	-	1.20	1.09	0.99	6.02		
Dec. 5	4.75	-	-	-	-	1.24	1.14	1.05	4.95		
Dec. 6	2.62	0.87	1.04	1.22	-	-	-	-	4.37		
Dec. 8	3.00	1.05	1.18	1.31	-	-	1.31	1.20	1.11	3.81	
Dec. 10	.97	.94	1.04	1.18	-	-	-	-	1.52		
Dec. 18	3.45	-	1.05	1.22	-	-	-	-	5.79		
Dec. 23	3.45	-	-	-	-	-	1.16	1.07	.99	2.74	
Means	-	.95	1.08	1.23	-	-	1.19	1.12	1.03	-	
Departures	-	.01	-.02	-.01	-	-	-.01	+.06	+.08	-	

TABLE 1.—Solar radiation intensities during December 1941—Con.

[Gram-calories per minute per square centimeter of normal surface]

MADISON, WIS.

Date	Sun's zenith distance											
	7:30 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	1:30 p.m.	
	75th mer. time	Air mass									Local mean solar time	
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.	
Dec. 2	mm.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	mm.		
Dec. 6	3.98	-	-	-	-	-	1.26	-	-	1.66		
Dec. 10	2.06	-	-	-	-	-	1.03	1.28	-	1.71		
Dec. 18	.74	-	-	-	-	-	1.10	1.25	-	1.26		
Dec. 19	3.98	0.92	1.10	1.25	-	-	1.65	-	-	1.25		
Means	(.95)	1.08	1.25	-	-	-	1.64	-	-	1.21		
Departures	-	-.03	-.02	+.03	-	-	+.04	-	-	-.01		

BLUE HILL, MASS.

Date	1.6	0.97	1.06	—	—	—	—	—	—	—	1.25	1.11	0.99	1.9	
	3.5	—	—	—	—	—	—	—	—	—	—	.81	.71	3.5	
	4.0	.76	—	—	—	—	—	—	—	—	—	—	—	.95	3.3
	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dec. 8	1.6	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dec. 11	1.3	0.97	1.06	—	—	—	—	—	—	—	—	—	—	—	—
Dec. 17	3.5	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dec. 19	4.0	.76	—	—	—	—	—	—	—	—	—	—	—	—	—
Dec. 21	.6	1.03	1.11	1.29	—	—	—	—	—	—	—	—	—	—	—
Dec. 22	1.0	1.06	1.15	1.25	—	—	—	—	—	—	—	—	—	—	—
Dec. 25	4.2	.92	1.11	1.11	—	—	—	—	—	—	—	—	—	—	—
Dec. 28	2.9	.89	.98	1.12	—	—	—	—	—	—	—	—	—	—	—
Means	—	.94	1.08	1.12	—	—	—	—	—	—	—	—	—	—	—
Departures	—	+.05	+.02	-.06	—	—	—	—	—	—	—	—	—	—	—

*Extrapolated.

TABLE 2.—Average daily totals and weekly means of solar radiation (direct and diffuse) received on a horizontal surface

[Gram-calories per square centimeter]

Date	Washington	Madi- son	Lin- coln	New York	Chicago	Fresno	Albu- querque	Fair- banks	New- port	Cam- bridge	Friday Harbor	River- side	New Or- leans	La Jolla	State College	Ithaca	Twin Falls	Blue Hill
Dec. 3	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.	cal.
Dec. 4	165	43	224	150	18	124	261	—	190	119	122	55	55	91	145	169	42	206
Dec. 5	118	79	161	133	36	235	274	—	45	183	130	302	306	318	137	173	83	193
Dec. 6	79	33	239	17	17	265	312	—	101	96	28	296	263	303	57	54	215	158
Dec. 8	223	206	234	213	121	240	298	—	176	153	104	292	362	284	68	29	81	169
Dec. 7	243	123	204	238	117	226	311	—	94	127	119	269	257	293	242	98	208	112
Dec. 8	184	44	238	105	23	223	298	—	101	128	42	238	325	277	122	112	211	129
Dec. 9	148	105	226	89	108	104	249	—	158	162	63	43	243	175	42	41	197	150
Mean	166	90	218	135	63	201	286	—	7	124	87	214	250	227	115	97	148	159
Departure	+5	-26	+44	+11	-14	+16	+83	—	-9	+1	+5	+3	+48	-30	-2	-2	+27	+13
Dec. 10	229	207	203	116	70	74	—	134	158	50	230	64	289	141	140	60	224	—
Dec. 11	241	130	66	220	54	93	100	—	235	217	45	230	275	287	19	20	117	57
Dec. 12	103	49	66	124	42	90	213	—	207	154	89	75	241	131	89	103	41	193
Dec. 13	16	172	235	15	44	212	195											

TABLE 2.—*Average daily totals of solar radiation (direct + diffuse) received on a horizontal surface*

[Gram-calories per square centimeter]

LATE DATA—BLUE HILL OBSERVATORY, MILTON, MASS.

Date	Calories	Date	Calories	Date	Calories	Date	Calories
June 4	318	July 6	671	Aug. 6	632	Nov. 2	133
June 5	56	July 7	346	Aug. 7	629	Nov. 3	247
June 6	662	July 8	161	Aug. 8	625	Nov. 4	305
June 7	512	Mean	440	Aug. 9	506	Mean	180
June 8	584	July 9	524	Aug. 10	653	Nov. 5	211
June 9	783	July 10	690	Aug. 11	629	Nov. 6	39
June 10	662	July 11	609	Aug. 12	484	Nov. 7	132
Mean.	513	July 12	135	Mean.	594	Nov. 8	237
June 11	558	July 13	516	Aug. 13	632	Nov. 9	167
June 12	488	July 14	696	Aug. 14	505	Nov. 10	221
June 13	161	July 15	614	Aug. 15	316	Nov. 11	201
June 14	198	Mean	540	Aug. 16	234	Mean	172
June 15	295	July 16	415	Aug. 17	604	Nov. 12	266
June 16	224	July 17	108	Aug. 18	570	Nov. 13	193
June 17	645	July 18	400	Aug. 19	40	Nov. 14	164
Mean.	347	July 19	188	Mean.	414	Nov. 15	226
June 18	526	July 20	673	Aug. 20	619	Nov. 16	222
June 19	699	July 21	650	Aug. 21	569	Nov. 17	270
June 20	579	July 22	586	Aug. 22	518	Nov. 18	225
June 21	638	Mean	432	Aug. 23	441	Mean	224
June 22	680	July 23	515	Aug. 24	617	Nov. 19	200
June 23	176	July 24	357	Aug. 25	234	Nov. 20	212
June 24	709	July 25	576	Aug. 26	455	Nov. 21	247
Mean.	575	July 26	596	Mean.	493	Nov. 22	254
June 25	719	July 27	514	Aug. 27	419	Nov. 23	20
June 26	707	July 28	207	Aug. 28	599	Nov. 24	247
June 27	650	July 29	595	Aug. 29	563	Nov. 25	244
June 28	667	Mean	480	Aug. 30	437	Mean	203
June 29	436	July 30	103	Aug. 31	151	Nov. 26	172
June 30	584	July 31	205	Sept. 1	446	Nov. 27	197
July 1	456	Aug. 1	473	Sept. 2	578	Nov. 28	218
Mean.	603	Aug. 2	558	Mean.	456	Nov. 29	190
July 2	606	Aug. 3	523	Oct. 29	325	Nov. 30	67
July 3	612	Aug. 4	514	Oct. 30	107	Dec. 1	220
July 4	186	Aug. 5	555	Oct. 31	108	Dec. 2	45
July 5	494	Mean.	419	Nov. 1	28	Mean.	158

**POSITIONS, AREAS, AND COUNTS OF SUN SPOTS FOR
DECEMBER 1941—Continued**